DECISION TREE TECHNIQUE – A USEFUL TOOL FOR THE QUALITY MANAGEMENT OF A PROJECT

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Abstract: The paper proposes a valuable technique used in project management – the Decision Tree Technique. The application of the Decision Tree Technique in the paper is based on the concept of opportunity risk. The investment in quality within the project might be affected by the opportunity risk. For generating the decision alternatives was used WinQSB package.

Key words: quality, opportunity risk, Decision Tree (DT) Technique, project management

1. INTRODUCTION

Even if it said that quality is ultimately defined by the client and represents how close the project and its deliverables comes to meeting the client’s requirements and expectations, quality must be checked up and improved in every stage of the project lifecycle. The purpose of quality management in a project is to first understand the expectations of the client in terms of quality and then put a proactive plan in place to meet those expectations. All projects have some degree of uncertainty due to the assumptions associated with them and the environment in which they are executed. Projects with a higher level of risk require more rigorous risk management and more management focus. Although not all risks can be eliminated entirely, most can be anticipated and managed ahead of time.

Generally, the risk refers to future conditions or circumstances that exist outside of the control of the project team that will have an adverse impact on the project if they occur. However, our paper, proposes a more specific kind of risk: the opportunity risk (the positive risk). The purpose of risk management is to identify the risk events for a project and then establish a risk management plan to minimize the probability that the risk event will harm the project. The objective of risk management

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is to eliminate the risk event before it occurs or to minimize the impact of the risk if it
does occur. The “art” of risk management is to resolve potential problems before they
occur. In some cases, the manager introduces the risk in a stage of a project with the
goal of obtaining a benefit in a future stage of the project, or at the end. For example,
the investment in quality is an action affected by the opportunity risk. This is an
example of assumption with intelligence the risk.

2. THE METHODOLOGY OF RESEARCH

The DT Technique

Decision Trees are excellent tools for helping to choose between several
courses of action. They provide a highly effective structure within which we can lay
out options and investigate the possible outcomes of choosing those options. They also
help to form a balanced picture of the risks and rewards (benefits) associated with each
possible course of action (alternative).

Decision trees provide an effective method of Decision Making because they:
⇒ Clearly lay out the problem so that all options can be challenged;
⇒ Allow us to analyze fully the possible consequences of a decision;
⇒ Provide a framework to quantify the values of outcomes and the
probabilities of achieving them;
⇒ Help us to make the best decisions on the basis of existing information
and best guesses.

WinQSB

The appearance of management science software is one of the most important
events in decision making process. OR/MS software systems are used to construct
eamples, to understand the existing concepts, and to discover useful managerial
concepts. On the other hand, new developments in decision making process often
motivate developments of new solution algorithms and revision of the existing
software systems. OR/MS software systems rely on a cooperation of OR/MS
practitioners, designers of algorithms, and software developers.

We will use WinQSB package as a computer-assisted learning tool to gain a
good “hands-on” experience on concepts and DT Technique. The QSB (Quantitative
Systems for Business) software package contains the most widely used problem-
solving algorithms in Operations Research and Management Science (OR/MS). The
WinQSB is the Windows version of the QSB software package. The Da.exe “Decision
Analysis” module in your WinQSB package is used for two distinct purposes: to solve
large problems, and to perform numerical experimentation. Numerical experimentation
including what-if analysis of the payoff matrix and the subjective probability
assignments to the states of nature.
3. APPLYING THE DECISION TREE TECHNIQUE

The evaluation of the decisional alternatives within a project was realised with the purpose of increasing the quality of the touristic product named “Ski in the Parâng Mountains”. The decisional alternatives were analyzed using the DT Technique, and the problem was one of investment in quality (in a more specific way, in the quality of installations for the ski-lifts) that will be reflected in the quality of the deliverables of the project. DT Technique was used to optimize an investment portfolio.

The alternatives (V1 – Investment 1 – one single installation among the entire track; V2 – Investment 2 – three installations which divide the track in three parts; V3 – no investment) were analyzed related to the potential benefits and disadvantages that might be generated according to the following criteria:

- human resource involved in maintenance and surveillance of the installation (number, labour costs, qualification);
- technique characteristics/parameters of the installation;
- possibility of intervention in defects/interruptions cases;
- implications of defects appearance;
- clients requirements regarding the accessibility in the case of tracks with different kinds of difficulties.

The alternatives, probabilities, payoffs, and resulting expected value calculations are shown in the example tree below (Fig. 1, Fig. 2). In this case V2 (Investment 2) is expected to turn a profit, but V1 (Investment 1) has the higher expected value.

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<tr>
<th>01-30-2007</th>
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<th>Type</th>
<th>Expected value</th>
<th>Decision</th>
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<td>V1</td>
</tr>
<tr>
<td>2</td>
<td>V1</td>
<td>Chance node</td>
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<td>V2</td>
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</tr>
<tr>
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<td>Event4</td>
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<td>Event5</td>
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</tr>
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<td>V1</td>
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</table>

Fig. 1. The resulting expected value calculations using the WinQSB package:
CONCLUDING REMARKS

The DT Technique is frequently utilized for providing alternative solutions in decisional processes affected by risk. The DT Technique offers the possibility to analyze the parameters with great influence upon a decisional situation that must be solved by the project team. The alternatives were generated using the WinQSB package, the Da.exe “Decision Analysis” module, as a computer-assisted tool.

The obtained results are analyzed by the project team and identified what is the most reasonable for the project: accepting and assuming high level of the opportunity risks (30 %, V1 – Investment 1) with the possibility of obtaining substantial benefits or assuming low level of the opportunity risks (6 %, V2 – Investment 2) with small but guaranteed profits.

The project team must have an overview regarding the results and their implication on the project’s deliverables. It not must be forgotten the “voices” of the clients, the requirements of the clients that can’t be quantified. This makes the team project decisions to be affected by subjectivism because, in fact, the client decides if the project is a success or a failure.

REFERENCES

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